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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/902,283	07/10/2001	Chen-An Chen	3130/D1/ICG/PMD/LE	8681
32588	7590	12/03/2003	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			MACARTHUR, SYLVIA	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/902,283

Applicant(s)

CHEN ET AL.

Examiner

Sylvia R MacArthur

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 11-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 11-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. *Claims 1, 2, 4, 6, 7, 11-14, and 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Nguyen et al (US 5,925,189) in view of Micard (USP 4,684,104).*

Regarding claims 1, 9, 12, and 22: Nguyen discloses a method of vaporizing a processing liquid comprising providing an injection valve 24 having a vaporization region 64 (inherently since col. 2 lines 44-47 discusses that the liquid is converted to gas), a processing liquid inlet 26, a carrier gas inlet 30, an outlet coupled to the vaporization region and adapted to outlet 32, pressurized processing liquid is flowed into the vaporization region of the injection valve according to col. 2 lines 37-40. Regarding the pressure drop Nguyen in col.1 lines 25 and 26 that injection valve 24 causes the liquid to vaporize into gaseous form via a pressure drop.

Nguyen fails to teach a wave generator or means of vibrating the vaporization region.

Micard discloses coupling piezoelectric elements to injection valves. These elements generate waves as they vibrate when stacked upon one another as discussed in col. 1 lines 16-32.

The motivation to modify the injection valve of Nguyen to provide the piezoelectric elements of Micard is that it is arranged for exerting on closure member 30 (control valve) a percussion force for throwing said closure member from the first abutment position to the second abutment position upon application of an electrical voltage to said piezoelectric means and for

throwing said closure member from the second abutment position to the first abutment position upon removal of said electrical voltage. Col.1 lines 23-46 disclose a controlled valve that is used as an actuator (opening/closing the valve to adjust flow).

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the injection valve of Nguyen to include the wave generator of Micard in the form of piezoelectric elements.

Regarding claim 2: Micard cites in col. 2 lines 22-26 the movement of the closure member (causing flow of the processing fluid) is simultaneous with the contracting and expansion of the piezoelectric elements.

Regarding claims 4 and 11: Note that the piezoelectric effect of Micard generates waves to output a voltage signal, see claim 1 of Micard.

Regarding claims 6, 7, 13, 14, and 23-27: Nguyen recognizes the build-up of residue in an injection valve. Fig.4 illustrates a build-up of residue 82 around orifice 70, see col. 3 lines 12-17. Note residue is a gas line coupled between the injection valve and a semiconductor wafer processing chamber.

Regarding claims 16 and 17: Micard teaches that closure member 30 is a flexible plate which is coupled to the piezoelectric element 14.

Regarding claim 18, the limitation “the wave generator outputting a voltage signal of zero volts to open the processing liquid inlet” is an intended use in that the wave generator is capable outputting a voltage signal of zero when the generator is turned off.

Regarding claim 19: see the rejection of claims 4 and 11.

Regarding claims 20 and 21, wherein the voltage signal is D.C. It would have been obvious to provide a D.C. voltage signal as it is a suitable means of voltage from a limited number of choices A.C. or D.C.

3. *Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Micard, in further view of Ketchum (USP 5,413,671).*

The teachings of Nguyen and Micard were discussed above.

Both fail to teach performing a cleaning process.

Ketchum teaches an apparatus provided for removing deposits, which accumulate within a continuous APCVD. Cleaning is performed in-situ. As wafers 16 enter chamber 12, thin film materials or dopant materials are directed upon wafer 16 via injector 18. Injector 18 receives vaporized material.

The motivation to combine the teachings of Nguyen and Micard with those of Ketchum is to provide a cleaning process within the process chamber is to remove deposits of residue in-situ.

Thus, it would have been obvious to combine the teachings of Nguyen, Micard and Ketchum to provide a cleaning process within a semiconductor processing system.

Response to Arguments

4. Applicant's arguments filed August 15, 2003 have been fully considered, but are moot in view of new grounds of rejection.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 703-306-5690. The examiner can normally be reached on M-F during the core hours of 8 a.m. and 2 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Application/Control Number: 09/902,283

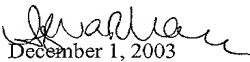
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Sylvia R MacArthur

Patent Examiner

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December 1, 2003

